

LESSON 4-2: Multiplying Positive Integers on the Quadrant Mat

Objective

To multiply positive numbers

Vocabulary

Factor Track, Quadrant Mat, positive number, product rectangle, plus sign

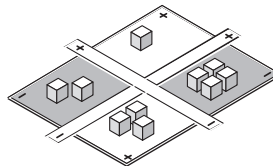
Additional Materials

Lesson 4-2 Worksheet (on CD-ROM)

Introducing the Lesson

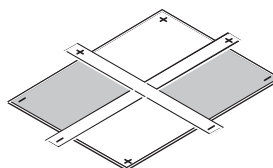
Introduce the Quadrant Mat to students. Have them relate the gray and white sections to those of the Basic Mat. Students may describe the Quadrant Mat as two Basic Mats joined together, one of them upside down. Explain that this mat will be used to multiply positive and negative numbers.

Have students place 1, 2, 3, and 4 green unit blocks on the Quadrant Mat like this:



Ask students to tell you what numbers are shown on the mat. [+1, -2, +3, -4] If necessary, review the fact that placing a block on a gray negative area gives it a negative value.

Show students how to place the Factor Track on the Quadrant Mat. Remind them that the open sides of the tracks must be up so that blocks can be inserted into the grooves. Point out that two of the arms of the Factor Track are now labeled with plus signs. The other two arms have minus signs.



Teaching the Lesson

Explain to students that in this lesson they will practice using the Factor Track and the Quadrant Mat to multiply two positive integers. They will work with negative integers in later lessons.

Step 1: Ask:

- We are multiplying two positive numbers. Where on the Factor Track will you put two positive numbers? [the top and right arms]
- Why can't you put these factors on the left and bottom arms? [Blocks on the left or bottom arm show negative numbers.]

Make certain all students understand this convention for showing positive and negative factors.

Step 2: Have students build the product rectangle. Ask:

- Does this rectangle show a positive or a negative number? How do you know? [It shows a positive number because it is on a white, or positive, section of the mat.]

Work with students to complete the last two steps. Point out how removing the Factor Track makes the product rectangle easier to see.

Have students model several other examples. If some students are having difficulty understanding what to do, pair them with others who have mastered the steps. If students understand the technique, have them complete the lesson independently. If students need further instruction, do the rest of the page as a whole-class activity.

Journal Entry

Make a sketch of the Quadrant Mat. Identify the positive and negative sections.

Answer Key

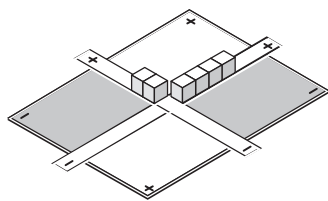
Lesson 4-2: Multiplying Positive Integers on the Quadrant Mat

Positive factors go on the top and right parts of the Factor Track.

Example: Use the Factor Track and Quadrant Mat. Model 2×4 .

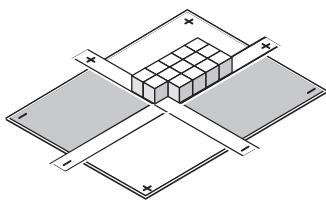
Step 1.

Model the factors on the Factor Track. The plus signs show you where to put the two factors.



Step 2.

Solve. Build the product rectangle on the mat. Remove the Factor Track when you are finished.



Step 3.

Read the mat. Notice the plus sign in this part of the mat. This means the product is positive.

Product: 8

Step 4.

Record.

$$2 \times 4 = 8$$

Try It

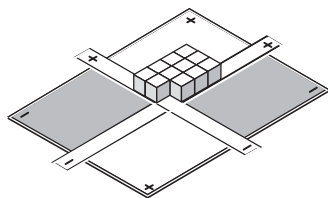
- Which two parts of the Factor Track are used for positive factors? the top and right arms
- If you multiply two positive numbers, where will the product rectangle be? in the upper-right part of the Quadrant Mat

Practice

The drawings show Step 2 for each problem. Complete each problem.

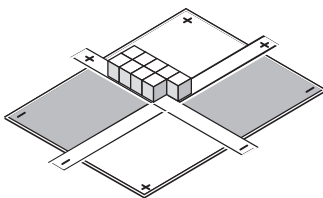
For Exercises 3 to 5, students should remove the Factor Track and then write a multiplication sentence.

3.



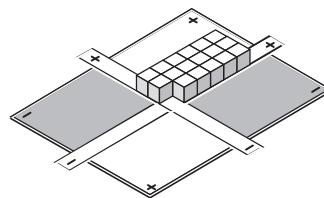
$$2 \times 3 = 6$$

4.



$$4 \times 1 = 4$$

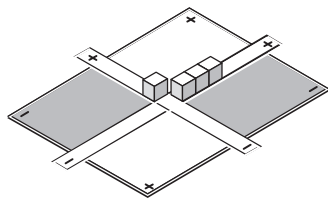
5.



$$2 \times 5 = 10$$

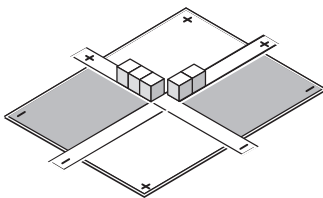
The drawings show Step 1 for each problem. Complete each problem.

6.



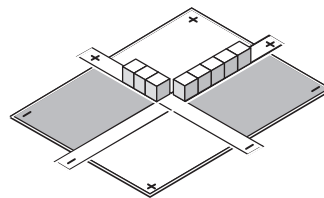
$$1 \times 3 = 3$$

7.



$$3 \times 2 = 6$$

8.



$$3 \times 5 = 15$$